

Claims

1. A computer-implemented video compression method comprising:
compressing a segment of an input signal using an initial quality setting;
calculating a data rate for an output signal that would result from adding the
compressed segment to the output signal; and
in response to the calculated data rate exceeding a target rate, recompressing
the segment using an automatically-selected quality setting that produces
a lower data rate than the calculated data rate when the recompressed
segment is added to the output signal.
2. The method of claim 1, further comprising:
in response to the calculated data rate being lower than the target rate,
recompressing the segment using an automatically-selected quality setting
that produces a higher data rate than the calculated data rate when the
recompressed segment is added to the output signal.
3. The method of claim 1, wherein the automatically-selected quality setting
comprises a quality quantizer.
4. The method of claim 1, wherein the automatically-selected quality setting
comprises at least one of a frame size and a frame rate.

5. The method of claim 1, wherein the segment comprises a sub-frame.
6. The method of claim 1, wherein the initial quality setting comprises an automatically-selected quality setting for a previous segment.
7. The method of claim 1, wherein automatically selecting comprises selecting a quality setting that is a function of the difference between the calculated data rate and the target rate.
8. The method of claim 1, wherein automatically selecting comprises selecting a next numerically higher or lower quality setting depending on whether the calculated data rate is higher or lower than the target rate.
9. The method of claim 1, wherein automatically selecting comprises using an artificial intelligence (AI) system to select the quality setting based on one or more characteristics of the segment.

10. A computer-implemented video compression method comprising:
- for each of a plurality of segments of an input signal:
- compressing a segment using an initial quality setting;
 - calculating a data rate for an output signal that would result from adding the compressed segment to the output signal; and
 - in response to the calculated data rate deviating from a target range:
 - automatically selecting a quality setting that results in a calculated data rate within the target range when a segment compressed using the automatically-selected quality setting is added to the output signal; and
 - recompressing the segment using the automatically-selected quality setting.
11. The method of claim 10, wherein the automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.
12. The method of claim 10, wherein automatically selecting comprises selecting a quality setting that is a function of the distance between the calculated data rate and the target range.
13. The method of claim 10, wherein automatically selecting comprises selecting a next numerically higher or lower quality setting depending on whether the calculated data rate is higher or lower than the target range.

14. The method of claim 10, wherein automatically selecting comprises using an artificial intelligence (AI) system to select the quality setting based on one or more characteristics of the segment.
15. A computer-implemented video compression method comprising:
obtaining an input signal comprising a plurality of segments;
automatically selecting different quality settings to respectively compress at least two of the segments, wherein the quality settings for each segment are automatically selected to maintain within a target range a data rate of an output signal to which the compressed segments are to be added;
compressing the segments using the automatically selected quality settings; and
adding the compressed segments to the output data signal.
16. The method of claim 15, wherein an automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.
17. The method of claim 15, wherein automatically selecting comprises:
testing a plurality of different automatically-selected quality settings for compressing a segment; and
selecting one of the tested quality settings that is to produce a data rate within the target range when the segment is compressed using the selected setting and added to the output signal.

18. The method of claim 15, wherein automatically selecting comprises:
testing, for an established time period, a plurality of different automatically-selected quality settings for compressing a segment; and
selecting the tested quality setting that produces the closest data rate to the target range in response to the established time period expiring.
19. The method of claim 17, wherein each successive automatically-selected quality setting to be tested is a function of the distance between the target range and a calculated data rate for a previous automatically-selected quality setting.
20. The method of claim 15, wherein automatically selecting comprises using an artificial intelligence (AI) system to select the quality setting based on one or more characteristics of the segment.
21. The method of claim 15, wherein the AI system is selected from the group consisting of a neural network and an expert system.
22. The method of claim 20, wherein the one or more characteristics are selected from the group consisting of motion characteristics and color characteristics.
23. The method of claim 15, further comprising adjusting the target range in response to constraints of a destination system for receiving the output signal.

24. The method of claim 15, further comprising adjusting the target range in response to conditions of a transmission channel to a destination system for receiving the output signal.
25. A computer-implemented video compression method comprising:
compressing a segment using an initial quality setting;
calculating a data rate for an output signal that would result from adding the compressed segment to the output signal;
while the calculated data rate deviates from a target range, automatically selecting a different quality setting that results in a new calculated data rate that is closer to the target range; and
in response to an automatically-selected quality setting resulting in a data rate that is within the target range, compressing the segment using the automatically-selected quality setting.
26. The method of claim 25, wherein the automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.
27. The method of claim 25, wherein automatically selecting comprises using an artificial intelligence (AI) system to select the quality setting based on one or more characteristics of the segment.

28. The method of claim 27, wherein the AI system is selected from the group consisting of a neural network and an expert system.
29. The method of claim 27, wherein each successive automatically-selected quality setting is a function of the distance between the target range and a calculated data rate for a previous automatically-selected quality setting.
30. The method of claim 25, further comprising adjusting the target range in response to one of constraints of a destination system for receiving the output signal and conditions of a transmission channel to the destination system.
31. A video compression system comprising:
an input module to receive an input signal comprising a plurality of segments;
a compression module to compress a segment using an initial quality setting;
a rate calculation module to calculate a data rate for an output signal that would result from adding the compressed segment to the output signal;
wherein the compression module, in response to the calculated data rate exceeding a target rate, is to recompress the segment using an automatically-selected quality setting that produces a lower data rate than the calculated data rate when the recompressed segment is added to the output signal.

32. The system of claim 31, wherein the compression module, in response to the calculated data rate being lower than the target rate, is to recompress the segment using an automatically-selected quality setting that produces a higher data rate than the calculated data rate when the recompressed segment is added to the output signal.
33. The system of claim 31, wherein the automatically-selected quality setting comprises a quality quantizer.
34. The system of claim 31, wherein the automatically-selected quality setting comprises at least one of a frame size and a frame rate.
35. The system of claim 31, wherein the segment comprises a sub-frame.
36. The system of claim 31, wherein the initial quality setting comprises an automatically-selected quality setting for a previous segment.
37. The system of claim 31, further comprising a selection module to automatically select a quality setting that is a function of the difference between the calculated data rate and the target rate.
38. The system of claim 31, further comprising a selection module to automatically select a next numerically higher or lower quality setting depending on whether the calculated data rate is higher or lower than the target rate.

39. The system of claim 31, further comprising a selection module that is to use an artificial intelligence (AI) system to automatically select the quality setting based on one or more characteristics of the segment.

40. A video compression system comprising:

a compression module to compress each of a plurality of segments of an input signal using an initial quality setting;

a rate calculation module to calculate, for each compressed segment, a data rate for an output signal that would result from adding a compressed segment to the output signal; and

a selection module to automatically select, in response to the calculated data rate deviating from a target range, a quality setting for each segment that results in a data rate this is within the target range when a segment compressed using the automatically-selected quality setting is added to the output signal.

41. The system of claim 40, wherein the automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.

42. The system of claim 40, wherein the selection module is to automatically select a quality setting that is a function of the difference between the calculated data rate for a segment and the target range.

43. The system of claim 40, wherein the selection module is to automatically select a next numerically higher or lower quality setting depending on whether the calculated data rate for a segment is higher or lower than the target range.

44. The system of claim 40, wherein the selection module is to use an artificial intelligence (AI) system to automatically select the quality setting based on one or more characteristics of each segment.

45. A video compression system comprising:
an input module to obtain an input signal comprising a plurality of segments;
a selection module to automatically select different quality settings to respectively compress at least two of the segments, wherein the quality settings for each segment are automatically selected to maintain within a target range a data rate of an output signal to which the compressed segments are to be added;
a compression module to compress the segments using the automatically selected quality settings; and
an output module to add the compressed segments to the output data signal.

46. The system of claim 45, wherein an automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.

47. The system of claim 45, wherein the selection module is to test a plurality of different automatically-selected quality settings for compressing a segment and select one of the tested quality settings that is to produce a data rate within the target range when the segment is compressed using the selected setting and added to the output signal.

48. The system of claim 47, wherein the selection module is to test, for an established time period, a plurality of different automatically-selected quality settings for compressing a segment and select the tested quality setting that produces the closest data rate to the target range in response to the established time period expiring.

49. The system of claim 47, wherein each successive automatically-selected quality setting to be tested is a function of the difference between a target range and a calculated data rate for a previous automatically-selected quality setting.

50. The system of claim 45, wherein the selection module is to use an artificial intelligence (AI) system to automatically select the quality setting based on one or more characteristics of the segment.

51. The system of claim 45, wherein the AI system is selected from the group consisting of a neural network and an expert system.

52. The system of claim 50, wherein the one or more characteristics are selected from the group consisting of motion characteristics and color characteristics.

53. The system of claim 45, wherein the selection module is to adjust the target range in response to constraints of a destination system for receiving the output signal.

54. The system of claim 45, wherein the selection module is to adjust the target range in response to conditions of a transmission channel to a destination system for receiving the output signal.

55. A video compression system comprising:
a compression module to compress a segment using an initial quality setting;
a rate calculation module to calculate a data rate for an output signal that would result from adding the compressed segment to the output signal;
a selection module to automatically select, while the calculated data rate deviates from a target range, a different quality setting that results in a new calculated data rate that is closer to the target range;
wherein the compression module, in response to an automatically-selected quality setting resulting in a data rate that is within the target range, is to compress the segment using the automatically-selected quality setting.

56. The system of claim 55, wherein the automatically-selected quality setting comprises at least one of a quality quantizer, a frame size, and a frame rate.

57. The system of claim 55, wherein the selection module is to use an artificial intelligence (AI) system to automatically select the quality setting based on one or more characteristics of the segment.

58. The system of claim 57, wherein the AI system is selected from the group consisting of a neural network and an expert system.

59. The system of claim 57, wherein the selection module is to choose each successive automatically-selected quality setting based on a function of the distance between the target range and a calculated data rate for a previous automatically-selected quality setting.

60. The system of claim 55, wherein the selection module is to adjust the target range in response to one of constraints of a destination system for receiving the output signal and conditions of a transmission channel to the destination system.

61. A computer program product comprising:
a computer-readable medium having stored therein
program instructions for obtaining an input signal comprising a plurality of
segments;
program instructions for automatically selecting different quality settings to
respectively compress at least two of the segments, wherein the

quality settings for each segment are automatically selected to maintain within a target range a data rate of an output signal to which the compressed segments are to be added;

program instructions for compressing the segments using the automatically selected quality settings; and

program instructions for adding the compressed segments to the output data signal.

62. A propagated signal in a transmission medium comprising:
- a code segment for causing a computer to obtain an input signal comprising a plurality of segments;
 - a code segment for causing a computer to automatically select different quality settings to respectively compress at least two of the segments, wherein the quality settings for each segment are automatically selected to maintain within a target range a data rate of an output signal to which the compressed segments are to be added;
 - a code segment for causing a computer to compress the segments using the automatically selected quality settings; and
 - a code segment for causing a computer to add the compressed segments to the output data signal.